

SEQUENCE LISTING

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<120> Insecticidal Proteins From *Bacillus Thuringiensis*

<130> 021565-083

<140> US 09/739,243

<141> 2000-12-19

<150> US 60/173,387

<151> 1999-12-28

<160> 13

<170> PatentIn version 3.0

<210> 1

<211> 3687

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Ala Arg Ile Glu Asp Ser Leu Cys Ile Ala Glu Gly Asn Asn Ile Asn	
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Thr Glu Asn Ala Arg Asn Thr Ala Leu Ala Arg Leu Gln Gly Leu Gly	
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Phe Tyr Ser Phe Leu Val Gly Glu Leu Trp Pro Arg Gly Arg Asp Gln
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Cys Arg Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu
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 Lys Pro Glu Glu Val Phe Leu Asp Gly Glu Arg Ile Leu Pro Asp Ile
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gat cca ctc gaa gtt tct ttg tgc ctt ttg caa ttt ctt ttg aat aac 144
 Asp Pro Leu Glu Val Ser Leu Ser Leu Leu Gln Phe Leu Leu Asn Asn
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cag ttg att gat cga aga ata gaa gca aca gta aga gca aaa gca atc 288
 Gln Leu Ile Asp Arg Arg Ile Glu Ala Thr Val Arg Ala Lys Ala Ile
 85 90 95

gct gaa tta gaa ggt tta ggg aga agt tat caa cta tat gga gag gca 336
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Phe Gly Glu Arg Trp Gly Leu Ser Thr Thr Asn Val Asn Asp Ile Tyr	
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Asn Arg Gln Val Lys Arg Ile His Glu Tyr Ser Asp His Cys Val Asp	
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 Gly Ala Leu Arg Pro Ser Glu Trp Glu Leu Phe Leu Ala Gln Ile Glu
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 Gln Leu Ile Asp Arg Arg Ile Glu Ala Thr Val Arg Ala Lys Ala Ile

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385	390	395	400
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Val Pro Pro His Arg Gly Tyr Ser His Leu Leu Ser His Val Thr Met	420	425	430
His Asn Ser Ser Pro Ile Phe His Trp Thr His Arg Ser Ala Thr Pro	435	440	445
Arg Asn Ile Ile Tyr Pro Asp Ser Ile Thr Gln Ile Pro Val Val Lys	450	455	460
Ala Ser His Leu Ser Gly Gly Ser Val Ile Lys Gly Pro Gly His Thr	465	470	475
Gly Gly Asp Leu Ile Ser Leu Pro Val Asn Asn Phe Thr His Phe Arg	485	490	495
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Ile Pro Val Asp Ala Thr Phe Glu Ala Gly Tyr Asn Leu Glu Arg Ala	595	600	605
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Gln Thr Asp Val Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val	625	630	635
Asp Cys Leu Ser Asp Glu Phe Cys Leu Asp Glu Lys Arg Lys Leu Ser	645	650	655
Glu Lys Val Lys Gln Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu	660	665	670
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Asp Gly Leu Phe Val Asp Ser Gln Tyr Glu Arg Leu Gln Ser Asp Thr 900 905 910		
Asn Ile Ala Met Ile His Ala Ala Asp Lys Arg Val His Arg Ile Arg 915 920 925		
Glu Ala Tyr Leu Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala 930 935 940		
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Cys Trp Asn Val Lys Gly His Val Asp Ile Lys Gln Asn Gly His Arg 980 985 990		
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625 630 635 640	
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Val Tyr Leu Asp Arg Ile Glu Ile Ile Pro Val Asn Pro Thr Arg Glu	
645 650 655	
gcg gaa gag gat tta gaa gcg gcg aag aaa gcg gtg gcg agc ttg ttt	2016
Ala Glu Glu Asp Leu Glu Ala Ala Lys Lys Ala Val Ala Ser Leu Phe	
660 665 670	
aca cgc aca agg gac gga tta caa gta aat gtg aca gat tat caa gtc	2064
Thr Arg Thr Arg Asp Gly Leu Gln Val Asn Val Thr Asp Tyr Gln Val	
675 680 685	
gat caa gcg gca aat tta gtg tca tgc tta tca gat gaa caa tat gcg	2112
Asp Gln Ala Ala Asn Leu Val Ser Cys Leu Ser Asp Glu Gln Tyr Ala	
690 695 700	
cat gat aaa aag atg tta ttg gaa gcg gta cgc gcg gca aaa cgc ctc	2160
His Asp Lys Lys Met Leu Leu Glu Ala Val Arg Ala Ala Lys Arg Leu	
705 710 715 720	
agc cga gaa cgt aac tta ctt cag gat cca gat ttt aat aca atc aat	2208
Ser Arg Glu Arg Asn Leu Leu Gln Asp Pro Asp Phe Asn Thr Ile Asn	
725 730 735	
agt aca gaa gaa aat gga tgg aaa gca agt aac ggc gtt act att agt	2256

Ser	Thr	Glu	Glu	Asn	Gly	Trp	Lys	Ala	Ser	Asn	Gly	Val	Thr	Ile	Ser		
			740					745						750			
gag	ggc	ggt	cca	ttc	tat	aaa	ggc	cgt	gca	ctt	cag	cta	gca	agt	gca	2304	
Glu	Gly	Gly	Pro	Phe	Tyr	Lys	Gly	Arg	Ala	Leu	Gln	Leu	Ala	Ser	Ala		
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cga	gaa	aat	tac	cca	aca	tac	atc	tat	caa	aaa	gta	gat	gca	tcg	gag	2352	
Arg	Glu	Asn	Tyr	Pro	Thr	Tyr	Ile	Tyr	Gln	Lys	Val	Asp	Ala	Ser	Glu		
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tta	aaa	cct	tat	aca	cga	tat	aga	ctg	gat	ggg	ttc	gtg	aag	agt	agt	2400	
Leu	Lys	Pro	Tyr	Thr	Arg	Tyr	Arg	Leu	Asp	Gly	Phe	Val	Lys	Ser	Ser		
785					790					795					800		
caa	gat	tta	gaa	att	gat	ctc	att	cac	cat	cat	aaa	gtc	cat	ctt	gtg	2448	
Gln	Asp	Leu	Glu	Ile	Asp	Leu	Ile	His	His	His	Lys	Val	His	Leu	Val		
				805					810					815			
aaa	aat	gta	cta	gat	aat	tta	gta	tct	gat	act	tac	cca	gat	gat	tct	2496	
Lys	Asn	Val	Leu	Asp	Asn	Leu	Val	Ser	Asp	Thr	Tyr	Pro	Asp	Asp	Ser		
			820					825					830				
tgt	agt	gga	atc	aat	cga	tgt	gag	gaa	caa	cag	atg	gta	aat	gcg	caa	2544	
Cys	Ser	Gly	Ile	Asn	Arg	Cys	Glu	Glu	Gln	Gln	Met	Val	Asn	Ala	Gln		
		835					840					845					
ctg	gaa	aca	gaa	cat	cat	cat	ccg	atg	gat	tgc	tgt	gaa	gca	gct	caa	2592	
Leu	Glu	Thr	Glu	His	His	His	Pro	Met	Asp	Cys	Cys	Glu	Ala	Ala	Gln		
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aca	cat	gag	ttt	tct	tcc	tat	att	gat	aca	ggg	gat	tta	aat	tcg	act	2640	
Thr	His	Glu	Phe	Ser	Ser	Tyr	Ile	Asp	Thr	Gly	Asp	Leu	Asn	Ser	Thr		
865					870					875					880		
gta	gac	cag	gga	atc	tgg	gtg	atc	ttt	aaa	gtt	cga	aca	aca	gat	ggt	2688	
Val	Asp	Gln	Gly	Ile	Trp	Val	Ile	Phe	Lys	Val	Arg	Thr	Thr	Asp	Gly		
				885					890					895			
tat	gcg	acg	cta	gga	aat	ctt	gaa	ttg	gta	gag	gtc	gga	ccg	tta	ttg	2736	
Tyr	Ala	Thr	Leu	Gly	Asn	Leu	Glu	Leu	Val	Glu	Val	Gly	Pro	Leu	Leu		
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ggt	gaa	cct	cta	gaa	cgt	gaa	caa	aga	gaa	aat	gcg	aaa	tgg	aat	gca	2784	
Gly	Glu	Pro	Leu	Glu	Arg	Glu	Gln	Arg	Glu	Asn	Ala	Lys	Trp	Asn	Ala		
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gag	tta	gga	aga	aaa	cgt	gca	gaa	aca	gat	cgc	gtg	tat	caa	gat	gcc	2832	
Glu	Leu	Gly	Arg	Lys	Arg	Ala	Glu	Thr	Asp	Arg	Val	Tyr	Gln	Asp	Ala		
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Lys	Gln	Ser	Ile	Asn	His	Leu	Phe	Val	Asp	Tyr	Gln	Asp	Gln	Gln	Leu		
945					950					955					960		
aat	cca	caa	ata	ggg	atg	gca	gat	att	atg	gac	gct	caa	aat	ctt	gtc	2928	
Asn	Pro	Gln	Ile	Gly	Met	Ala	Asp	Ile	Met	Asp	Ala	Gln	Asn	Leu	Val		

965	970	975	
gca tca att tca gat gta tat agc gat	gca gta ctg caa atc cct gga	2976	
Ala Ser Ile Ser Asp Val Tyr Ser Asp	Ala Val Leu Gln Ile Pro Gly		
980	985 990		
att aac tat gag att tac aca gag ctg tcc aat cgc tta caa caa gca	3024		
Ile Asn Tyr Glu Ile Tyr Thr Glu Leu Ser Asn Arg Leu Gln Gln Ala			
995 1000 1005			
tcg tat ctg tat acg tct cga aat gcg gtg caa aat ggg gac ttt aac	3072		
Ser Tyr Leu Tyr Thr Ser Arg Asn Ala Val Gln Asn Gly Asp Phe Asn			
1010 1015 1020			
aac ggg cta gat agc tgg aat gca aca gcg ggt gca tcg gta caa cag	3120		
Asn Gly Leu Asp Ser Trp Asn Ala Thr Ala Gly Ala Ser Val Gln Gln			
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gat ggc aat acg cat ttc tta gtt ctt tct cat tgg gat gca caa gtt	3168		
Asp Gly Asn Thr His Phe Leu Val Leu Ser His Trp Asp Ala Gln Val			
1045 1050 1055			
tcc caa caa ttt aga gtg cag ccg aat tgt aaa tat gta tta cgt gta	3216		
Ser Gln Gln Phe Arg Val Gln Pro Asn Cys Lys Tyr Val Leu Arg Val			
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aca gca gag aaa gta ggc ggc gga gac gga tac gtg act atc cgg gat	3264		
Thr Ala Glu Lys Val Gly Gly Gly Asp Gly Tyr Val Thr Ile Arg Asp			
1075 1080 1085			
ggt gct cat cat aca gaa acg ctt aca ttt aat gca tgt gat tat gat	3312		
Gly Ala His His Thr Glu Thr Leu Thr Phe Asn Ala Cys Asp Tyr Asp			
1090 1095 1100			
ata aat ggc acg tac gtg act gat aat acg tat cta aca aaa gaa gtg	3360		
Ile Asn Gly Thr Tyr Val Thr Asp Asn Thr Tyr Leu Thr Lys Glu Val			
1105 1110 1115 1120			
ata ttc tat tca cat aca gaa cac atg tgg gta gag gta aat gaa aca	3408		
Ile Phe Tyr Ser His Thr Glu His Met Trp Val Glu Val Asn Glu Thr			
1125 1130 1135			
gaa ggt gca ttt cat ata gat agt att gaa ttc gtt gaa aca gaa aag	3456		
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taa	3459		

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 <213> Bacillus thuringiensis

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Pro Asn Ala	Val Phe Gln Asn	Met His Tyr Lys	Asp Tyr Leu Gln Thr
	35	40	45
Tyr Asp Gly	Asp Tyr Thr Gly	Ser Phe Ile Asn	Pro Asn Leu Ser Ile
	50	55	60
Asn Pro Arg	Asp Val Leu Gln	Thr Gly Ile Asn	Ile Val Gly Arg Leu
	65	70	75
Leu Gly Phe	Leu Gly Val Pro	Phe Ala Gly Gln	Leu Val Thr Phe Tyr
	85	90	95
Thr Phe Leu	Leu Asn Gln Leu	Trp Pro Thr Asn	Asp Asn Ala Val Trp
	100	105	110
Glu Ala Phe	Met Ala Gln Ile	Glu Glu Leu Ile	Asn Gln Arg Ile Ser
	115	120	125
Glu Ala Val	Val Gly Thr Ala	Ala Asp His Leu	Thr Gly Leu His Asp
	130	135	140
Asn Tyr Glu	Leu Tyr Val Glu	Ala Leu Glu Glu	Trp Leu Glu Arg Pro
	145	150	155
Asn Ala Ala	Arg Thr Asn Leu	Leu Phe Asn Arg	Phe Thr Thr Leu Asp
	165	170	175
Ser Leu Phe	Thr Gln Phe Met	Pro Ser Phe Gly	Thr Gly Pro Gly Ser
	180	185	190
Gln Asn Tyr	Ala Val Pro Leu	Leu Thr Val Tyr	Ala Gln Ala Ala Asn
	195	200	205
Leu His Leu	Leu Leu Lys Asp	Ala Glu Ile Tyr	Gly Ala Arg Trp
	210	215	220
Gly Leu Asn	Gln Asn Gln Ile	Asn Ser Phe His	Thr Arg Gln Gln Glu
	225	230	235
Arg Thr Gln	Tyr Tyr Thr Asn	His Cys Val Thr	Thr Tyr Asn Thr Gly
	245	250	255
Leu Asp Arg	Leu Arg Gly Thr	Asn Thr Glu Ser	Trp Leu Asn Tyr His
	260	265	270
Arg Phe Arg	Arg Glu Met Thr	Leu Met Ala Met	Asp Leu Val Ala Leu
	275	280	285
Phe Pro Tyr	Tyr Asn Val Arg	Gln Tyr Pro Asn	Gly Ala Asn Pro Gln
	290	295	300
Leu Thr Arg	Glu Ile Tyr Thr	Asp Pro Ile Val	Tyr Asn Pro Pro Ala

305 310 315 320
 Asn Gln Gly Ile Cys Arg Arg Trp Gly Asn Asn Pro Tyr Asn Thr Phe
 325 330 335
 Ser Glu Leu Glu Asn Ala Phe Ile Arg Pro Pro His Leu Phe Asp Arg
 340 345 350
 Leu Asn Arg Leu Thr Ile Ser Arg Asn Arg Tyr Thr Ala Pro Thr Thr
 355 360 365
 Asn Ser Tyr Leu Asp Tyr Trp Ser Gly His Thr Leu Gln Ser Gln Tyr
 370 375 380
 Ala Asn Asn Pro Thr Thr Tyr Glu Thr Ser Tyr Gly Gln Ile Thr Ser
 385 390 395 400
 Asn Thr Arg Leu Phe Asn Thr Thr Asn Gly Ala Asn Ala Ile Asp Ser
 405 410 415
 Arg Ala Arg Asn Phe Gly Asn Leu Tyr Ala Asn Leu Tyr Gly Val Ser
 420 425 430
 Tyr Leu Asn Ile Phe Pro Thr Gly Val Met Ser Glu Ile Thr Ser Ala
 435 440 445
 Pro Asn Thr Cys Trp Gln Asp Leu Thr Thr Thr Glu Glu Leu Pro Leu
 450 455 460
 Val Asn Asn Asn Phe Asn Leu Leu Ser His Val Thr Phe Leu Arg Phe
 465 470 475 480
 Asn Thr Thr Gln Gly Gly Pro Leu Ala Thr Val Gly Phe Val Pro Thr
 485 490 495
 Tyr Val Trp Thr Arg Gln Asp Val Asp Phe Asn Asn Ile Ile Thr Pro
 500 505 510
 Asn Arg Ile Thr Gln Ile Pro Val Val Lys Ala Tyr Glu Leu Ser Ser
 515 520 525
 Gly Ala Thr Val Val Lys Gly Pro Gly Phe Thr Gly Gly Asp Val Ile
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 Arg Arg Thr Asn Thr Gly Gly Phe Gly Ala Ile Arg Val Ser Val Thr
 545 550 555 560
 Gly Pro Leu Thr Gln Arg Tyr Arg Ile Arg Phe Arg Tyr Ala Ser Thr
 565 570 575
 Ile Asp Phe Asp Phe Phe Val Thr Arg Gly Gly Thr Thr Ile Asn Asn
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 Phe Arg Phe Thr Arg Thr Met Asn Arg Gly Gln Glu Ser Arg Tyr Glu
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 Ser Tyr Arg Thr Val Glu Phe Thr Thr Pro Phe Asn Phe Thr Gln Ser

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Lys	Gln	Ser	Ile	Asn	His	Leu	Phe	Val	Asp	Tyr	Gln	Asp	Gln	Gln	Leu
945					950					955					960
Asn	Pro	Gln	Ile	Gly	Met	Ala	Asp	Ile	Met	Asp	Ala	Gln	Asn	Leu	Val
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Ala	Ser	Ile	Ser	Asp	Val	Tyr	Ser	Asp	Ala	Val	Leu	Gln	Ile	Pro	Gly
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Ile	Asn	Tyr	Glu	Ile	Tyr	Thr	Glu	Leu	Ser	Asn	Arg	Leu	Gln	Gln	Ala
		995					1000					1005			
Ser	Tyr	Leu	Tyr	Thr	Ser	Arg	Asn	Ala	Val	Gln	Asn	Gly	Asp	Phe	Asn
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Asp	Gly	Asn	Thr	His	Phe	Leu	Val	Leu	Ser	His	Trp	Asp	Ala	Gln	Val
			1045					1050					1055		
Ser	Gln	Gln	Phe	Arg	Val	Gln	Pro	Asn	Cys	Lys	Tyr	Val	Leu	Arg	Val
		1060					1065					1070			
Thr	Ala	Glu	Lys	Val	Gly	Gly	Gly	Asp	Gly	Tyr	Val	Thr	Ile	Arg	Asp
	1075					1080						1085			
Gly	Ala	His	His	Thr	Glu	Thr	Leu	Thr	Phe	Asn	Ala	Cys	Asp	Tyr	Asp
	1090					1095					1100				
Ile	Asn	Gly	Thr	Tyr	Val	Thr	Asp	Asn	Thr	Tyr	Leu	Thr	Lys	Glu	Val
1105					1110					1115				1120	
Ile	Phe	Tyr	Ser	His	Thr	Glu	His	Met	Trp	Val	Glu	Val	Asn	Glu	Thr
			1125					1130					1135		
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 cry1B.fw

<400> 7
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20

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<220>

<223> Description of Artificial Sequence: primer B.R

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<210> 9
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<223> Description of Artificial Sequence: primer B.F

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gcagctaata ctaccacatc

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<223> Description of Artificial Sequence: primer JRV

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